consider the phenomenon of Santee as a certain and authenticated instance of the appearance of the circumhorizontal arc of Galle.

However this may be, it may be asked why it is that this arc is rarely or never seen, whereas the circumzenithal arc is relatively common. I have given an explanation, which I believe to be satisfactory, in a note entitled "The halo of April 5, 1899," and published in the Annuaire of the Meteorological Society of France, 47th year, 1899. According to my opinion the lower extremities of the ice prisms are not plane, but pointed, on account of the existence of oblique facets. Consequently, as the diedral angles of 90° necessary to the formation of the circumhorizontal arc do not exist, this phenomenon can not take place. The same hypothesis gives at one and the same time the explanation of the vertical orientation of the axes of the prisms, which latter is incomprehensible if we admit that these prisms are regular; their nearly vertical position is due to the fact that the resistance of the air is very small when the pointed end is turned toward the bottom.

CLIMATOLOGICAL DATA FOR JAMAICA.

Through the kindness of H. H. Cousins, chemist to the Government of Jamaica and now in charge of the meteorological service of that island, we have received the following table in advance of the regular monthly weather report for Jamaica:

Comparative table of rainfall for October, 1902.

Divisions.	Relative area.	Number of stations.	Rainfall.	
			Average.	1902.
	Per cent.		*Inches.*	*Inches.*
Northeastern division	25	21	13.87	7.41
Northern division	22	47	7.99	5.58
West-central division	26	21	14.13	10.91
Southern division	27	32	12.42	4.87
	100	120	12.10	7.19

The rainfall for the whole island was very much below the average. The heaviest fall recorded was 22.73 inches, at Troy, in the west-central division; the lowest was 1.12 inches, at Pedro Plains, in the southern division.

NOTES AND EXTRACTS.

WEATHER BUREAU MEN AS INSTRUCTORS IN METEOROLOGY.

Mr. H. W. Richardson, Local Forecast Official at Duluth, Minn., states that on Tuesday, October 14, he began a series of seven weekly lectures to the pupils of the State Normal School at West Superior, Wis., on subjects that have been arranged so as to conform as nearly as practicable to the meteorological studies of the class in physiography. The addresses will be given in the large lecture room and to the entire school. The topics to be discussed are as follows:

(1) The Weather Bureau. (2) Meteorological instruments; theory, construction, and use. (3) Circulation of the atmosphere; pressure, temperature, winds, and precipitation. (4) Cyclones, hurricanes, thunderstorms, and tornadoes. (5) Cold waves, warm waves, frost, dew, etc. (6) The weather of the United States, with especial reference to the climate of Duluth and West Superior. (7) Weather maps and how to use them.

We understand that, as a preliminary arrangement, these lectures will be delivered with the aid of a few notes and that no formal papers have been prepared on the above subjects. We would, however, respectfully suggest that it would be well to reduce to writing such a systematic series of lectures by one of our oldest observers and give the newspapers or other publishers a chance to print and distribute for the benefit of a larger class of students.

Mr. James H. Scarr, Observer, Weather Bureau, Sacramento, Cal., has made arrangements to deliver a lecture on the Weather Bureau in that city.

Mr. J. Weeks, Observer, Weather Bureau, Macon, Ga., reports lecturing to a portion of the members of the class in physical geography in the High School in that city. The lecture will be repeated hereafter to the members of the class.

BACK NUMBERS OF THE MONTHLY WEATHER REVIEW.

The Editor is informed that the Library of the Royal Meteorological Society, Prince's Mansions, 70 Victoria street, London, S. W., desires to obtain the MONTHLY WEATHER REVIEW for March and April, 1875, in order to complete its set. As neither of these numbers can be furnished by the Central Office, the Editor would be glad to hear from any one who can supply them, or, possibly, the complete volume for 1875.

WATERSPOUT AT CAPE MAY, N. J.

Mr. H. A. McNally, Observer, Weather Bureau, reports that on October 7, 4:30 p. m., at Cape May, N. J., a low and ominous cloud was observed scudding over the ocean from southwest to northeast. At 4:44 p. m. a disturbance in the water slightly in advance of the front of the approaching cloud quickly developed into a cone, with its point uppermost and moved rapidly toward the southwest. In a very short time a similar cone, point downward, was seen on the lower surface of the cloud. In less than a minute the two points came in contact and an ideal hourglass formation was maintained for two or three minutes. The waterspout gradually became cylindrical and moved rapidly in the same direction as the cloud, but suddenly disappeared upward as though drawn up by suction. Rain was observed falling from the cloud as it advanced toward the northeast. The spout was distant about 5 miles and lasted six or seven minutes.

SEVERE HAILSTORM AT ST. LOUIS, MO.

The hailstorm at St. Louis, Mo., at 9:20 p. m., Sunday, October 12, was remarkable, not only because of its occurrence at night, but because of the size of the hailstones, the largest were certainly as large as hens' eggs, and, although it lasted but seven minutes, yet it was the worst hailstorm that has ever visited St. Louis. It covered an area extending from Tower Grove Park on the south to the fair grounds on the north and thence northwestward and southeastward to an unknown extent. The general progress of the storm as it approached from the west was foretold as to rain, but the hail seems to have been a local phenomenon. Dr. R. J. Hyatt, Local Forecast Official at St. Louis, says that the storm did not have the customary oval shape, but was of irregular formation and very jagged.

VOLCANIC AND ATMOSPHERIC PHENOMENA.

Mr. Hermann E. Hobbs, Observer, Weather Bureau, at St. Kitts, W. I., under date of October 24, writes as follows:

St. Kitts and Dominica.—Very little out of the ordinary occurred after the 8th of June, 1902, until the 4th of August, when at 7:57 p. m. there was a severe shock of earthquake. This shock, like the previous ones of recent date, was sharp and appeared to be vertical rather than horizontal in movement. There was another on August 17 at 6:16 p. m., slight; one on September 11 at 7:54 a. m., and one in the early morning of September 15 between 12 and 1 a. m. The heavier shocks were preceded by a preliminary rumbling noise. There have been no earthquakes since the last date.

On the evening of the eruption of August 30 there was a succession

of reports heard, lasting from 8:07 to 8:25 p. m. There was a slight trace of dust noticed falling at Basseterre, slightly more in Nevis, especially on the southeastern side about 15 miles from here, while in Montserrat enough fell to give a white appearance to the landscape. The dust cloud could be seen to the southeast and south, especially on the 2d of September. On the 3d of September the sunrise effect was very striking as the sun shone through the clouds of dust. There seem to have been an unusual number of days with light haze, but whether this was the effect of the dust clouds or the effect of aqueous vapor it is hard to decide. I am of the opinion that it was a combination of the two.

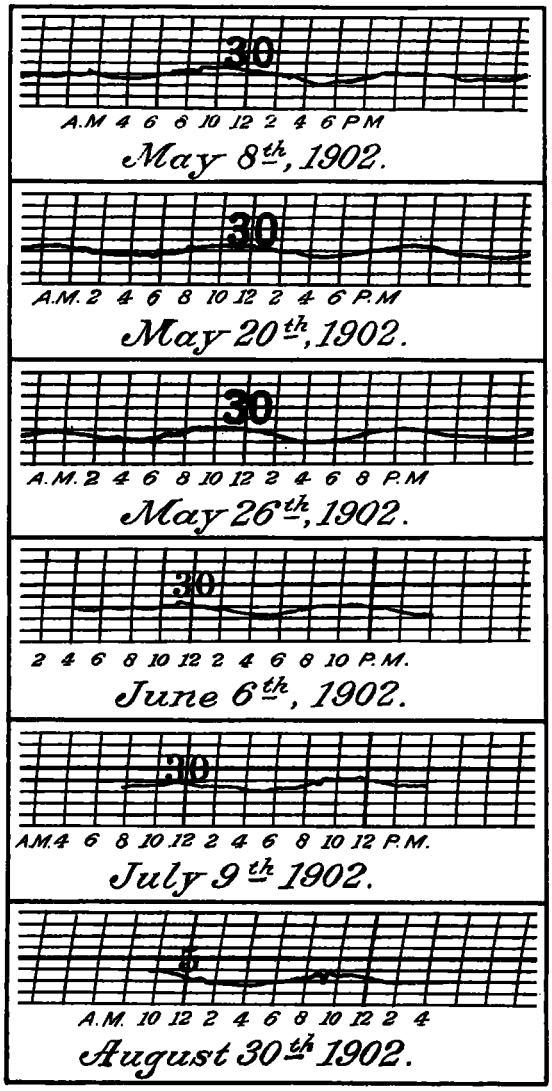

FIG. 1.

I have noticed that while the entire "hurricane season" has been marked by an almost entire absence of decided disturbances to the eastward, the direction of the upper clouds, when visible, has been continually shifting either to the northward or to the southward, usually the latter. The direction would swing around to about south-southeast and then return to normal. This has been repeated continually throughout the summer, occasionally varied by a swing through the northern quadrant.

It would appear as though there were some obstacle to the eastward which prevented the upper currents from flowing from that direction; may this not have been caused by the two columns of heated air rising from the scenes of the eruptions keeping the usual heated air layers stirred up and preventing the heated air from suddenly rising and thus starting a cyclonic disturbance?

I have also noticed that last summer (1901) the mercurial column in the sunshine recorder would often extend itself into the upper bulb, while this summer it has barely reached the contact wires on a great many days, especially in May, June, and July; even on clear days when no haze was visible this effect would be noticed.

I have the honor to enclose copies of the barograph sheets which were kindly loaned me by Mr. W. H. Porter, of Dominica, for the purpose of copying for the use of the Bureau. (See fig. 1.)

They are prints from photographic negatives taken from the original sheets on the days of the greatest eruptions and show quite distinctly the wave effect in the atmosphere.

San Juan.—Mr. E. C. Thompson, Section Director, San Juan, Porto Rico, W. I., reports that with the rainfalls of September 1 and 2 there fell an appreciable quantity of fine volcanic ashes at several stations on the island. One observer filtered 25 cuartillos of rain water and obtained about 5 gramos of ashes. This is supposed to have come from the eruption of August 30 on Martinique.

Turks Island.—Mr. D. Budge, General Station Superintendent for the Halifax and Bermuda Cable Company, at Halifax, N. S., writes: "Our agent at Turks Island reports that from the 29th of August to the 1st of September a heavy mist or haze has been observable around the island; it was so heavy on the 31st of August that the surrounding islands could barely be seen. The days were sunshiny and extremely hot. From what I hear it seems to be an unusual phenomenon here, and I report it as it may be of interest in view of the present volcanic eruptions in the West Indies."

Guatemala.—According to newspaper reports an eruption of the volcano Santa Maria in Guatemala began and continued until October 31 or later. This was a repetition of the eruptions in the same neighborhood in April and May. On October 26 there was a sudden and violent eruption of the volcano of Isalco 20 miles from Acajutla on the coast of San Salvador, after that volcano had been quiet for six months, but this eruption was short lived, whereas the flames, smoke, and ashes from Santa Maria produced widespread destruction. Santa Maria is between Retalhulen and Quezeltenango and in the neighborhood of the towns of San Felige, Mazatenango, and Quezeltenango; its latitude is north 15° and longitude west 92°. Mount Pelee, on Martinique, is in latitude north 14° 50′ and longitude 61° 20′ west. The latter is, therefore, nearly 2,000 miles east of Santa Maria. The smoke and ashes from Santa Maria spread northwestward over Guatemala and Mexico, while those from Pelee and Soufrière spread first southwest, with the lower northeast trades, then easterly with the upper winds and again southwest as they descended into the lower trade.

ROBERT RUBENSON.

We regret to announce the death of Prof. Dr. Robert Rubenson, Director of the Central Meteorological Institute of Sweden on October 14, 1902, after a long illness. Professor Rubenson was born April 10, 1829, and was the author of many works on the climatology of Sweden. Among his earliest memoirs was his investigation of the polarization of blue sky light, and one of his latest was the complete record of ancient observations of auroras in Sweden.

CORRIGENDA.

In September Review for 1902, page 447, column 2, lines 26 and 29 from bottom for "day" read "hour." Line 22 from bottom for "2" read "20." Line 21 from bottom for "1500" read "150."

THE WEATHER OF THE MONTH.

By W. B. STOCKMAN, Forecast Official, in charge of Division of Records and Meteorological Data.

CHARACTERISTICS OF THE WEATHER FOR OCTOBER.

The temperature was above normal in daily values of + 0.2° to + 3.4° in all of the geographical districts except the south Pacific, where the departure averaged 0.5° per day below normal.

The precipitation was in excess of the normal in the Atlantic and east Gulf States, North Dakota, and the middle slope and middle and south Pacific districts; in the remaining districts it was slightly deficient.

In the south Atlantic, Florida Peninsula, and southern slope districts the relative humidity was normal; below normal in New England, upper Lake, Plateau, and north Pacific districts, and above normal elsewhere.

The cloudiness was above the average in New England, south Atlantic, Florida Peninsula, east Gulf, lower Lake, middle slope,